



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

JUN 12 2017

OFFICE OF
SOLID WASTE AND
EMERGENCY RESPONSE
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EMERGENCY MANAGEMENT

MEMORANDUM

SUBJECT: Concurrence on Region 10 Regional Remedy Review Team Recommendation for the Ballard Mine Superfund Site

FROM: Amy R. Legare, Chair
National Remedy Review Board *AR Legare*

TO: James E. Woolford, Director
Office of Superfund Remediation and Technology Innovation

PURPOSE

The purpose of this memorandum is to provide background information on the Ballard Mine Superfund site in Caribou County, Idaho and inform you of Region 10's request for a full National Remedy Review Board (NRRB) review exemption. Based on the information Region 10 provided and subsequent discussions with the Office of Superfund Remediation and Technology Innovation (OSRTI) staff, I agree with the Region's decision that this site does not warrant a full NRRB review with the condition the Region develop quantitative lines of evidence before selecting MNA as part of the preferred alternative. I am requesting your concurrence, including the condition, with the Region's request for exemption from full Board review.

BACKGROUND

Effective October 1, 2014, the NRRB began a pilot to review proposed Superfund response actions that are estimated to cost more than \$50 million and to implement the Regional Remedy Review Team (RRRT) process. The RRRT review, which entails a modified NRRB-like review, includes sites from across all regions with projected response costs between \$25 million and \$50 million. The RRRT review also includes consideration of stakeholder concerns and other site circumstances to determine if a response action warrants a full NRRB review. If not, the RRRT can recommend to the Superfund regional division director (SRDD) that such a review is not warranted. Attached to this memorandum is

the Region 10 SRDD's request for your concurrence that the Ballard Mine response action does not warrant a full NRRB review.

Region 10 established an RRRT to conduct a review of this response action. The RRRT included the Office of Environmental Cleanup (ECL) unit manager, the ECL senior policy advisor, the Office of Research and Development Superfund technology liaison, several senior remedial project managers, human health and ecological risk assessors, the site attorney and the community involvement coordinator.

The Ballard Mine site is a historic open-pit phosphate mine located in the phosphate mining district of southeast Idaho. The Ballard Mine is not a National Priorities List site. An Administrative Settlement Agreement and Order on Consent/Consent Order was entered into voluntarily by the U.S. Environmental Protection Agency (EPA), Idaho Department of Environmental Quality (IDEQ), U.S. Forest Service (USFS), U.S. Department of the Interior (DOI), U.S. Bureau of Land Management (BLM), the Shoshone-Bannock Tribes, and P4 Production, LLC (P4). P4 is a wholly owned subsidiary of the Monsanto Company.

The Ballard Mine was operated from 1951 to 1969 and includes approximately 534 acres of mining disturbance consisting of six external waste rock dumps, six open pits, an abandoned haul road, and the Ballard Shop Area.

The primary source of contamination is approximately 19 million cubic yards of waste shale. The waste shale is enriched with metals, metalloids, and non-metals (in particular selenium), naturally occurring uranium, and uranium-daughter products (e.g., radium-226 and radon-222). Waste shale containing elevated levels of selenium and other contaminants were placed on the surface. Vegetation growing on contaminated surface material is elevated in selenium, with some plant species accumulating very high (hyper-accumulating) concentrations of selenium. Contaminants are leached from the waste shale source material by snowmelt or rainfall. Dissolved and particulate-bound selenium and other contaminants are transported from the source areas by surface water runoff to downstream waterbodies. Water that infiltrates down through waste dumps may reappear as contaminated toe seeps, intercept underlying groundwater forming plumes downgradient of source material, or appear as seeps in the stream channels leading from the Site.

There are unacceptable risks to human health under various exposure scenarios, and to various ecological receptors, including small mammals and birds. There are also acute effects to grazing livestock following very short duration exposure to selenium plants. Other contaminants of concern also contribute to unacceptable chronic risk, including metals and radionuclides.

Surface water and groundwater alternatives considered a variety of treatment options. Upland soil/waste rock alternatives focused on consolidation, grading and capping. Sediment/riparian soil alternatives each had a monitored natural recovery component. The preferred remedy costs approximately \$43 million and includes the following four components:

- Upland Soil/Waste Rock Alternative 6—Upland Soil/Waste Rock Grading and Consolidation, Incidental Ore Recovery, Evapotranspiration (ET) Cover System, Institutional Controls (ICs), Land Use Controls (LUCs), and Operation and Maintenance/Long Term Monitoring (O&M/LTM) (\$38.4 M)
- Surface Water Alternative 3—In Situ (Wetlands) Treatment of Source Area Seepage, ICs and LUCs, in conjunction with source controls in the upland soil/waste rock (\$1.4 M)

- Sediment/Riparian Soil Alternative 3—Sediment Traps/Basins, Monitored Natural Recovery (MNR), ICs and LUCs, in conjunction with source controls in the upland soil/waste rock (\$0.7 M)
- Groundwater Alternative 3—Limited Permeable Reactive Barrier (PRB) Treatment of Alluvial Groundwater, Monitored Natural Attenuation (MNA), and ICs, in conjunction with source controls in the upland soil/waste rock (\$2.0 M)
- Ballard Shop—Interim ICs/LUCs are recommended at the Ballard Shop to limit potential exposures while use of this portion of the Site continues. A separate OU, feasibility study (FS) and ROD for this area will happen in the future.

Support Agencies and the Shoshone-Bannock Tribe have been actively involved with the development of the remedial investigation and FS and support the preferred alternative. There has been little congressional or community interest in this site.

ANALYSIS

Alternative 6 for upland soil/waste rock includes incidental ore recovery. It is an innovative, cost-effective option that will reduce the scope and cost of implementing the remedial action.

The RRRT was generally supportive of the preferred alternative but did caution that decision documents should be clear that EPA does not have the authority to authorize mining operations. The site team re-evaluated the reliability and effectiveness of remedy components (i.e., permeable reactive barriers and engineered wetlands) to confirm that the elements will work together to achieve surface and groundwater objectives in a reasonable timeframe. The RRRT questioned the adequacy of MNA documentation. Additional information was obtained and will be placed in the FS. However, this documentation on lines of evidence is qualitative not quantitative. Generally, regions submit a MNA report to OSRTI for review prior to proposing MNA in the preferred alternative. MNR versus an excavation and reconstruction approach was also discussed. MNR documentation is also qualitative. Each approach has its uncertainties. The RRRT and site team did not reach consensus on MNR or excavation. The headquarters sediment team advises that quantitative documentation for MNR is not always available prior to remedy selection.

Please acknowledge your concurrence with the RRRT's recommendation that a full NRRB review is not warranted with the condition that quantitative MNA data be collected, evaluated and discussed with OSRTI prior to issuing a proposed plan. A signature page is provided in the attachment.

Attachment



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 10

1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ENVIRONMENTAL
CLEANUP

APR 06 2017

MEMORANDUM

SUBJECT: National Remedy Review Board Review is Not Warranted for the Ballard Mine Superfund Site Proposed Response Action

FROM: Sheryl Bilbrey, Director *Sheryl Bilbrey*
Office of Environmental Cleanup

TO: James E. Woolford, Director
Office of Superfund Remediation and Technology Innovation

Introduction and Purpose

This memorandum provides Region 10's rationale that the preferred response action at the Ballard Mine Superfund site in Caribou County, Idaho, does not warrant review by the National Remedy Review Board (NRRB). The Office of Solid Waste and Emergency Response (OSWER) Directive 9285.6-21 ("National Remedy Review Board Criteria Revision and Operational Changes," September 4, 2014), calls for regions to use a Regional Remedy Review Team (RRRT) to evaluate proposed Superfund site response actions costing between \$25 million and \$50 million to determine whether a full NRRB review is warranted. The preferred proposed response action at the Ballard Mine site is estimated to cost approximately \$43 million. The Region 10 RRRT reviewed the Ballard Mine site preferred remedy and recommended that a full NRRB review is not warranted.

Regional Remedy Review Team Process

The RRRT was comprised of the Office of Environmental Cleanup (ECL) Unit Manager (Beth Sheldrake), the ECL Senior Policy Advisor (Allison Hiltner), the ORD Superfund Technology Liaison - Region 10 (Kira Lynch), several senior Remedial Project Managers (RPMs) with experience at large mine sites and familiar with similar proposed remedy technologies (Bill Adams, Matt Wilkening, Chris Cora, Tracy Chellis, Dustin Bott), the site human health and ecological risk assessors (Marc Stifelman and Burt Shephard), the site attorney (Nick Vidargas), and the site community involvement coordinator (Kay Morrison).

The project team provided a site information package to the RRRT in advance of the RRRT meeting. The package summarized site information, principal findings of the remedial investigation and baseline risk assessment, and the feasibility study. On November 8, 2016, the RPM (David Tomten) presented the following information to the RRRT:

- Overview of site setting and background
- Overview of site characteristics
- Summary of remedial investigation, including conceptual site model
- Summary of risk assessment results

- Proposed Remedial Action Objectives and Preliminary Cleanup Levels
- Summary of remedial action alternatives for each media
- Summary of nine criteria evaluation
- Description of preferred combined response action, including institutional controls (ICs) and cost summary of technical and policy issues associated with preferred remedy

After the RPM's presentation, the RRRT engaged in questions and deliberations with the Site RPM and other members of the Site Team. A summary of key comments and recommendations, as well as follow-up actions by the project team is summarized in a following section of this memorandum.

Site Information and Preferred Response Action

Site Name: Ballard Mine Site (Site)

Location: Caribou County, Idaho
T7S, R42-43E (Northing 42°49'45.62"; Easting 111°28'55.37")

EPA ID: IDN001002859

NPL Listing: The Ballard Mine is not a National Priorities List (NPL) site. A remedial investigation and feasibility study (RI/FS) were prepared pursuant to an Administrative Settlement Agreement and Order on Consent/Consent Order (2009 CO/AOC). This 2009 CO/AOC was entered into voluntarily by the U.S. Environmental Protection Agency (EPA), Idaho Department of Environmental Quality (IDEQ), U.S. Forest Service (USFS), U.S. Department of the Interior (DOI), U.S. Bureau of Land Management (BLM), the Shoshone-Bannock Tribes, and P4 Production, LLC (P4). P4 is a wholly owned subsidiary of the Monsanto Company.

A site information package (attached) includes summary information on principal findings of the remedial investigation and feasibility study. Included is information describing the site (section 1), site history (section 2), scope and role of the response action (section 3), site characteristics (section 4), current and potential future land uses (section 5), summary of risk (section 6), preliminary remedial action objectives and cleanup levels for each medium of concern (section 7), description and analysis of alternatives (section 8 and 9), and a description of the preferred alternative (section 11). A brief overview of the site and the preferred remedy follows.

The Ballard Mine site is a historic open-pit phosphate mine located in the phosphate mining district of southeast Idaho. This mining district is an area where phosphate-rich sedimentary units are present at or near the surface and have been mined for the past 70+ years. There are many historic mines within the mining district, four active mines, and a number of proposed mines.

The Site is located approximately 13 miles north-northeast of Soda Springs, Idaho, in Caribou County. The Ballard Mine was operated from 1951 to 1969 and includes approximately 534 acres of mining disturbance consisting of six external waste rock dumps, six open pits, an abandoned haul road, and the Ballard Shop Area (location for maintaining/garaging heavy trucks and mining equipment). Most of the Site has been revegetated, with the exception of some mine pit areas and steep waste rock dump slopes. No ore processing occurred at the Site. Ore was hauled to Monsanto's processing plant near the town of Soda Springs.

P4 owns approximately 865 acres of surface rights with a surface easement from the state of Idaho on an additional 360 acres. This includes all of the properties associated with the Ballard Mine.

Adjoining properties are privately held ranching and farming properties. The nearest downstream federal land (approximately 1 mile southeast of the Site) is a 40-acre BLM parcel. The Shoshone-Bannock Tribes have treaty rights on unoccupied federal lands downstream from the site.

The primary source of contaminants at the Site, as at other phosphate mines in southeast Idaho, is waste rock. Approximately 19 million cubic yards of waste rock are present at the Ballard site. In particular, the waste shale between ore horizons contributes much of the constituent loading. The center waste shale, as it is known, represents a significant portion of the material in the waste rock dumps. The center waste shale is enriched with metals, metalloids, and non-metals (in particular selenium), naturally occurring uranium, and uranium-daughter products (for example, radium-226 and radon-222).

Selenium and other constituents have been released to the environment by a number of mechanisms. Waste rock containing elevated levels of selenium and other contaminants were placed on the surface. Vegetation growing on contaminated surface material is elevated in selenium, with some plant species (referred to "hyper-accumulators") accumulating very high concentrations of selenium. Contaminants are leached from the waste rock source material by snowmelt or rainfall that falls at the Site. Dissolved and particulate-bound selenium and other contaminants are transported from the source areas by surface water runoff to downstream waterbodies. Water that infiltrates down through waste dumps may reappear as contaminated toe seeps, intercept underlying groundwater forming plumes downgradient of source material, or appear as seeps in the stream channels leading from the Site. Although there are impacts to sediment in the ephemeral and intermittent stream channels near Site, the Site includes less than 5 acres or 10,000 cubic yards of contaminated sediment, so it would not be considered a "Tier 1" site under OSWER Directive 9285.6-08.

In addition, while this Site has impacts to groundwater and surface water, there are no underground workings or impounded waters that are associated with hydraulic risks. Thus, this Site would not trigger headquarters consultation under the March 29, 2016 "EPA Work Activities at Abandoned Hardrock Mining and Mineral Processing Sites" memorandum requiring regions to submit consultation packages for HQ review prior to initiating work at Hardrock Mining and Mineral Processing sites with actual, potential or unknown fluid hazards.

The RI and baseline risk assessment concluded that there are unacceptable risks associated with various media at the Ballard site (upland soil and waste rock, surface water, sediment and riparian soil, groundwater, and vegetation). There are unacceptable risks to human health under various exposure scenarios, and to various ecological receptors, including small mammals and birds. Acute effects to grazing livestock, including horses, sheep and cows, have been observed at the Ballard site (which resulted in the death of several cattle) and other nearby sites following very short duration exposure to hyper-accumulator plants, which illustrates the potential for adverse acute effects to some ecological receptors. Other contaminants of concern also contribute to unacceptable chronic risk, including metals and radionuclides.

To address these risks, the project team identified and analyzed a broad range of alternatives for each media. The media-specific alternatives analyzed included process options and technologies that have been used at other large mining sites in Idaho and the western U.S.

The preferred media-specific alternatives were then assembled into a combined or overall preferred combined remedy for the site. The preferred combined remedy includes the following medium-specific alternatives:

- Upland Soil/Waste Rock Alternative 6—Upland Soil/Waste Rock Grading and Consolidation, Incidental Ore Recovery, Evapotranspiration (ET) Cover System, ICs, Land Use Controls (LUCs), and Operation and Maintenance/Long Term Monitoring (O&M/LTM) (\$38.4 M)
- Surface Water Alternative 3—In Situ (Wetlands) Treatment of Source Area Seepage, ICs and LUCs, in conjunction with source controls in the upland soil/waste rock (\$1.4 M)
- Sediment/Riparian Soil Alternative 3—Sediment Traps/Basins, Monitored Natural Recovery (MNR), ICs and LUCs, in conjunction with source controls in the upland soil/waste rock (\$0.7 M)
- Groundwater Alternative 3—Limited Permeable Reactive Barrier (PRB) Treatment of Alluvial Groundwater, Monitored Natural Attenuation, and ICs, in conjunction with source controls in the upland soil/waste rock (\$2.0 M)
- Ballard Shop—Interim ICs/LUCs are recommended at the Ballard Shop to limit potential exposures while this portion of the Site continues to be used. We anticipate treating this small portion of the Site as a separate OU and issuing a separate FS and ROD for this area in the future.

A key element of the preferred combined remedy is the focus on source controls in the waste rock dump and mine pit areas. The preferred remedy would backfill pits and grade, shape and consolidate mine wastes, and then construct a 5- to 6-foot-thick ET cover system over the 500+ acre mining disturbance. Isolating the waste rock by constructing the ET cover system addresses direct contact risks with waste materials and vegetation uptake, and also minimizes release of contaminants to surface water and groundwater. Other elements of the combined remedy such as permeable reactive barriers, sediment control BMPs, and engineered wetlands to treat runoff and residual seepage would work in conjunction with the cover system to address impacts to surface water, shallow groundwater and sediment, and may be phased out in the longer term if no longer needed. An adaptive management approach would be used to guide implementation of these elements until source controls are fully effective and RAOs are achieved.

The preferred combined remedy would also allow P4 to recover residual ore during implementation of the remedy. Information collected during site characterization activities confirmed that about 4 million tons of phosphate ore remain at the Site, both exposed at the surface in the mine pit bottoms, and in the walls of existing mine pits. Recovery of this ore during implementation of the remedy will require continued close cooperation with the BLM, and would hinge on BLM issuing a mineral lease and approving a mine plan for ore recovery. The Proposed Plan and Record of Decision will be drafted to make clear that the CERCLA process is not authorizing ore recovery activities, and that the CERCLA 121(e) permit exemption does not apply to BLM mineral leasing and permitting requirements.

The ore recovery element of the combined remedy would generate additional waste rock to be managed, but would have several benefits related to short and long-term effectiveness. Much of the additional waste rock would be used to backfill existing mine pits (to a greater extent than other alternatives). Some of the waste rock may also be suitable (for example, those rock types with appropriate material properties including low levels of contaminants) for use in construction of the cover system. Compared to other alternatives, the ore-recovery alternative is more cost-effective.

The resulting final remedy would also include more natural and contiguous reclamation landforms that blend into the adjacent native upland surfaces and more effectively shed surface runoff from the cover system and site. A secondary benefit would be the recovery of a valuable resource that would otherwise not be economically recoverable following remedy implementation.

The preferred combined remedy would take approximately 6 to 8 years to implement (or about 2-3 years longer than other similarly protective alternatives (alternatives 4 and 7)). The preferred combined remedy would be more cost-effective than other alternatives because a significant portion of the cost of earthworks (backfill, consolidation and shaping of waste rock) is attributed to ore recovery, which reduces the scope and cost of remaining earthworks associated with implementation of the CERCLA remedial action.

RRRT Key Comments and Project Team Follow-Up Actions

Comment: The RRRT was generally supportive of the preferred combined remedy, including the recovery of residual ore during implementation of the remedy. There was quite a bit of discussion on the need to exercise care in coordinating authorities with BLM and in the crafting of a ROD. For example, the ROD needs to be clear that the mining operations are not explicitly part of the CERCLA remedy; EPA is not authorizing mining operations (BLM anticipates issuing a separate decision document) and we must ensure appropriate application of CERCLA 121(e) permit waivers, among other issues.

Response: *Noted. The project team recognizes the importance of these issues, and intends to work closely with the Region 10 Office of Regional Counsel, P4, BLM, and the Interior Solicitor's office staff on these matters.*

Comment: Several reviewers had questions about the reliability and effectiveness of various elements of the combined remedy, including use of PRBs for treatment of shallow alluvial groundwater, and engineered wetlands for treatment of residual contaminated seepage.

Response: *Since the RRRT meeting, the project team has requested additional information and analysis on the reliability and effectiveness of these management and treatment elements of the combined remedy from P4. The project team has evaluated this supplemental information, considered sources and magnitude of uncertainty, and has concluded that surface and groundwater cleanup objectives should be met within a reasonable timeframe. In addition, the FS has since been revised to present a more thorough explanation of how shallow groundwater and seepage are interconnected and how various elements of the combined remedy (including the cover system, PRBs, engineered wetlands, ICs, and LUCs) will work together to achieve cleanup objectives for surface water and shallow alluvial groundwater in a reasonable timeframe.*

Comment: Reviewers also had questions about the adequacy of documentation necessary to support MNA as an element of the combined remedy.

Response: *Since the RRRT meeting, the project team has requested additional information and documentation regarding lines of evidence to support MNA. The project team has evaluated this supplemental information, and has concluded that the combined remedy (source controls, PRBs along with MNA, ICs and LUCs) will be protective and should achieve MCLs within a reasonable timeframe. This information has been included in the draft final FS.*

Comment: With respect to the Sediment/Riparian alternative discussed above, the RRRT and project team discussed the pros and cons of a monitored natural recovery (combined with source controls, sediment control BMPs, ICs, and LUCs) approach versus an excavation and reconstruction approach for remediating contaminated sediment in intermittent drainages and riparian corridors in close proximity to the site, and recommended further evaluation of this element of the combined remedy. There were also questions raised about the time frame to reach the Remedial Action Objectives and cleanup goals for this element of the preferred remedy. There was no consensus on a preferred approach. Participants noted that each approach has uncertainty and trade-offs. For example, the excavation and removal approach must weigh the disruption and damage to riparian corridors and uncertainty associated with recovery of functions and values.

Response: *Since the RRRT meeting, the project team has evaluated this issue further, including reviewing supplemental information provided by P4. Included in this review was an assessment of the time frame anticipated for MNR to achieve cleanup objectives, and a more thorough analysis of the evaluation criteria for each action alternative. The project team continues to support an MNR-focused approach (combined with source controls, sediment control [Best Management Practices] BMPs, ICs, and LUCs). In addition, in the Proposed Plan we intend to include a structured adaptive management approach to guide implementation of the sediment/riparian alternative.*

Comment: The RRRT and project team discussed how recent developments related to water quality standards should be addressed in the Proposed Plan and subsequent ROD, in particular the criteria for selenium and arsenic. EPA recently issued a revised national chronic aquatic life criterion for selenium. In addition, Region 10 recently disapproved the State of Idaho's criterion for arsenic for the protection of human health.

Response: *The project team, after consultation with the State and other support agencies, intends to use the most recent criteria recommendations as proposed cleanup levels for surface water. Use of the most recent and more protective criteria for Se and As would not change the conclusions of the Feasibility Study, and would ensure that proposed cleanup levels are protective and reflect the latest scientific knowledge.*

The Site information package was updated following the RRRT meeting to address key comments and recommendations made by RRRT participants. The updated package is attached.

Support Agency and Stakeholder Input

The project team includes participants from the Idaho Department of Environmental Quality, the DOI Fish and Wildlife Service, and the Shoshone-Bannock Tribes. These organizations are signatories to the CO/AOC (2009), and have been active participants during development of the RI and FS. All of the support agencies support the preferred remedy, as does P4 (the responsible party). In addition, USFS and BLM, while not "support agencies" at the Ballard site, have actively participated in the development of the RI and FS. If the preferred remedy is selected, then BLM will continue to be involved and would be responsible for leasing recoverable phosphate ore and approving and administering mining operations.

There has been little congressional or community interest in this particular project over the past several years. The general messages while conducting interviews and community meetings is to make progress in cleaning up Ballard and other mining sites in the mining district, return lands to productive use, and not take actions that would harm the local economy. The preferred remedy is consistent with community input heard to date.


NRRB Review Not Recommended

Based on the information provided above and the fact that the technologies and approaches included in the combined preferred remedy have been used effectively at other large mine sites, and are well-suited to the conditions present at the Ballard Mine site, the Ballard Mine site RRRT recommends that a review of the preferred response action by the NRRB is not necessary. The State of Idaho and P4 concur with this recommendation.

When fully implemented, the preferred response action will be protective of human health and the environment and comply with ARARs in a reasonable amount of time. It is also less expensive than other similarly protective alternatives and incorporates reuse directly into the preferred remedy.

This is the first time that Region 10 has requested to opt-out of the NRRB review process for a site with response action costs less than \$50 million. We believe that this approach makes sense because the combined remedy uses demonstrated remedial technologies and is not controversial. Opting-out of full NRRB review for this site will allow for more efficient use of limited regional and headquarters resources and will allow us to move forward with a Proposed Plan for this site by the end of 2017.

I concur that review of the proposed response action by the NRRB is not warranted:


for James E. Woolford, Director

I do not concur:

James E. Woolford, Director

Attachment

